AURAL VERTIGO.

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TO-DAY I am supporting the theory of Dida Dederding of Copenhagen—that symptoms of deafness, tinnitus and vertigo with vomiting and diarrhœa, may be due to a faulty water metabolism. I do not mean to exclude other causes, for I can quote a severe case of vertigo and deafness which was cured by a tonsillectomy and another patient who was cured by the extraction of a tooth.

The fact that these symptoms may be due to a faulty water metabolism demands that we should test such a patient's water metabolism. The signs that would lead us to carry out these tests in a patient with the symptoms of deafness, tinnitus and vertigo, are:—Variability in the deafness and tinnitus, raised lower limit, absent or diminished bone conduction for a_1 435 d.v., and normal high limit in early cases.

Spontaneous nystagmus is present in the patients, if seen during or a few days after an attack and, according to Dederding, may be rendered evident by the inhalation of amyl nitrite.

Further signs are thickness of the skin over the calves of the legs and at the back of the neck, headache, rheumatism and local infiltration of the skin.

Labyrinth tests show a different reaction between the two ears to the turning test corresponding to a latent spontaneous nystagmus; the caloric reaction only shows a reduced or absent reaction in advanced cases, whilst the galvanic test is normal.

I carried out labyrinth tests for the purpose of this paper, but I believe it is unwise to subject such patients to these tests, as the variability in the deafness and tinnitus and the absent or diminished bone conduction are sufficient indications for carrying out the water metabolism tests.

The pathology is said to be an overloading of the whole body, especially the labyrinth, with fluid. Thus, the increase in weight is due to retention of water in the tissues as also are the subcutaneous infiltrations at the back of the neck and in the legs. These abnormal deposits of water in the labyrinth may produce displacement of the stapes, and hence aural phenomena; œdema of the meninges produces headache; œdema of the mucous membranes results in stenosis of the

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Eustachian tube; and œdema of the muscles and fasciae produces rheumatism.

The variability in deafness and tinnitus is due to a variable intake and loss of fluid. This variability can be seen during the water test, when a patient will complain of increased tinnitus, deafness, and giddiness, on drinking the 1000 c.c. of fluid which we administer.

Unless the patient shows a faulty water metabolism, it is no use treating the disease on that basis. The faulty water metabolism is demonstrated by asking a patient to drink 1000 c.c. of water and measuring the output for four hours. A normal person passes 1000 c.c. or more. An abnormal person will pass 500 to 600 c.c. and will increase in weight corresponding to the amount of retained fluid. Thus, if the patient passes 500 c.c. he ought to be 500 cgm. heavier. As a matter of fact, he will only be 250 or 300 cgm. heavier, as he loses a certain amount of fluid through the skin and lungs that is not measured in the output from the kidneys.

The second test, which also initiates the treatment, consists in giving intravenously 1 c.c. of the powerful diuretic, salyrgan. This produces a diuresis in both the normal and abnormal individual on the day following the injection, but the normal individual has a correspondingly diminished output on the second day, whilst the water-logged individual will show an increase over the normal output on the second day as well as on the first day.

The third test is to estimate the percentage of hæmoglobin, as many of these patients show only 75 per cent.

The treatment is life-long and consists in a no-salt diet, limited intake of water (sometimes even to one pint a day), increased output of water, viâ the skin by Turkish baths, viâ the lungs and skin by exercises and massage, viâ the kidneys by intravenous salyrgan, to commence with. Mild diuretics always make the patient worse.

If a patient does overstep the mark as regards fluid, I have found that bulbocapnine may arrest the symptoms. If given hypodermically, it acts in from five to fifteen minutes, whilst if given by the mouth it acts more slowly. Bulbocapnine does not suit some patients, as it leads to mild prostration and bursting headache.

Recently I have been able to demonstrate the action of bulbocapnine on the labyrinth. A patient, aged 14, had acute

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labyrinthitis. His vomiting continued for two days. On the evening of the second day I gave him 0·5 gram of bulbocapnine. Almost at once the vomiting ceased, so that he was able to retain fluids by mouth; his giddiness decreased, though the nystagmus was still evident.

If a patient is unable to take bulbocapnine, one must resort to atropine or ergotinine.

ILLUSTRATIVE CASES.

(I) A. H., male, aged 52, complains of intermittent deafness of three years' duration, tinnitus which varies in loudness, and giddiness which consists of everything appearing to go round from right to left, followed by vomiting and diarrhœa. Patient's former weight was 10½ st.; it is now 12 st. 7 lb. He has pain in front of the legs and knees and over the biceps, and this prevents him from taking exercise. He has suffered from cold feet for over two years and does not perspire. There are raised red patches on the right thigh.

On Examination.—The skin at the back of the neck and calves of legs is thickened. Both tympanic membranes are greatly retracted. Teeth, absent. No sign of infection in nose or throat. The affected ear showed a raised lower limit 128 d.v. Air-conduction (a_1 66 = 18) and bone-conduction decreased (a_1 15 = 8). High limit lowered (monochord 11943).

Rotation to the right produced nystagmus for twenty seconds without giddiness; rotation to the left produced nystagmus for twenty-five seconds with giddiness. In the Babinski-Weil test the patient walked towards the right, *i.e.*, towards the unaffected ear. Response to the galvanic test was normal. Water metabolism showed a retention of 600 c.c. The salyrgan test showed increased output over forty-eight hours.

Treatment with a limited fluid intake and no salt show, after the interval of a month, air-conduction for a 60 in. watch was increased from 6 in. to 54 in., the lower limit lowered to 32 d.v. from 128 d.v. air-conduction for a_1 increased from eighteen seconds to thirty-nine seconds, and bone-conduction increased from eight seconds to thirty seconds.

(II) Miss B., aged 47. Vertigo began in December 1930, whilst patient was drinking quantities of barley water in order to cure sciatica. January 1931.—Nausea, vomiting, giddiness and diarrhœa. When vomiting is over, giddiness is diminished. 11.8.31.—Complained of deafness and tinnitus in right ear.

On Examination.—The affected ear showed a raised lower limit (72 d.v.); air-conduction decreased (a_1 66 = 22″); bone-conduction was absent (a_1 15 = 0) and high limit lowered (C_4 = − 15″).

Rotation to the left produced no nystagmus; rotation to the right produced nystagmus in twenty-five seconds. Cold caloric test: right

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ear, nystagmus lasting two seconds; left ear, nystagmus lasting thirty-five seconds and nausea. The water metabolism test showed a retention of 300 c.c. The administration of water produced giddiness and tinnitus. The salyrgan test showed an increased output over forty-eight hours.

Treatment by no-salt diet and limited fluid intake resulted in a cure of all the giddiness except for a feeling of weight in the head and a tendency to walk to the left, which was cured by atropine per os, and a leech on the mastoid. Hearing tests showed low limit lowered from 72 d.v. to 32 d.v. Bone-conduction increased from 0 in. to 14 in.

(III) Miss L., aged 45, complained of room going round, sensation of falling to left, headaches which are greater when the attack comes on. The affected ear showed raised low limit (202 d.v.), decreased air-conduction (a_1 66 = 7″), slightly decreased bone-conduction (a_1 15″ = 12″), high limit lowered (C_4 = − 15″). A water metabolism test showed 427 c.c. retention. Treatment consists of limited fluid intake, no salt, and calcium diuretin gr. 15 t.d.s.

A month later the patient wrote to say that she had been free from any bad attacks.

(IV) H. W. B., male, aged 42, came to me in November 1929, with otitis media and tinnitus. The otitis media was cured by ionization. 17.10.31.—Deaf to shouting voice and all tuning forks. Gave history of drinking ten pints of fluid a day. I gave him an intravenous injection of salyrgan and put him on a pint of fluid a day and no salt. The result a week later was that he could hear conversational voice. A water metabolism test showed a retention of 595 c.c. This patient, although he was deaf owing to drinking too much fluid, was not giddy, because his labyrinth had been destroyed by old otitis media; the rotatory and caloric tests failed to produce nystagmus, but the galvanic test produced nystagmus with 5 m.a.

I have not shown any cases that have been benefited by bulbocapnine, but I have patients who constantly take it. One is a man aged 84, who was confined to bed and displayed a strong nystagmus and response to tuning-fork tests typical of a faulty water metabolism. His water metabolism was not tested. I ordered limitation of fluid, no salt, and bulbocapnine and I heard that he was soon able to walk about and that he keeps perfectly fit, unless he oversteps his limited fluid intake, when he resorts to bulbocapnine.

Another patient is a man, aged 48, who suffered from violent attacks of vertigo and vomiting. Tuning-fork tests reveal advanced nerve deafness. The labyrinth tests show nystagmus 30″ on turning to the right or left but no giddiness. Cold

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caloric 10 c.c.: no reaction in right ear and momentary nystagmus in the left ear; 60 c.c.: momentary nystagmus in the right ear. Galvanic test 14 m.a.: no nystagmus.

This patient always carries three tablets of bulbocapnine, as the drug prevents a severe attack of vertigo. He has also been much benefited by a no-salt diet and limited fluid intake, though his water metabolism was not tested, as he visited me before I employed these tests. He was placed on a limited fluid intake and no salt because he told me he was increasing in weight rapidly.

(V) Finally, I show charts from a case of aural vertigo in which there was not a faulty water metabolism. [Charts exhibited on screen.] The low limit was raised to 101 d.v. Air-conduction decreased (a_1 66 = 20″); bone-conduction increased (a_1 15 = 33″) and high limit was lowered ($C_4 = -15''$. $C_5 = 0$). Response to caloric and galvanic tests normal. Neither the water metabolism nor salyrgan tests showed retention. Acoustic tumour was excluded by the findings of the neurologist and the radiologist and by the normal response to the caloric test; so, as the vertigo had lasted for five years, I performed a Neumann's labyrinthectomy.

Der Verfasser unterstützt in dieser Arbeit die Ansicht von Dida Dederding, dass den Symptomen von Schwerhörigkeit, Ohrsausen und Schwindel in Verbindung mit Diarrhoeen und Erbrechen ein gestörter Wasserstoffwechsel zu Grunde liegen kann. Er hat bei einer Reihe von Patienten Versuche ausgeführt, um die Aufnahme und Abgabe des Wassers zu bestimmen. Daneben verwandte er ein kräftiges Diureticum, Salyrgan und verglich die Resultate von Individuen mit normalem Wasserhaushalt und solchen mit gestörter Wasserabgabe. Er bestimmte auch den Prozentgehalt an Haemoglobin und bespricht eingehend die Art der Behandlung, besonders in Bezug auf die Anwendung von Bulbocapnin.

L'auteur de cet article soutient l'opinion de Dida Dederding que les symptômes de la surdité, bourdonnements et vertiges, accompagnés de diarrhée et de vomissements, peuvent être dûs au métabolismes vicieux de l'eau. Il a fait des expériences sur une série de malades en vue d'apprécier l'ingestion et l'excretion d'eau. En outre, il a usé d'un puissant diurétique, le Salyrgan, et a comparé la façon de réagir de l'individu en état de retention aqueuse avec l'individu normal. Il apprecie également le pourcentage d'hémoglobine et discute le traitement d'une façon assez détaillée, en particulier en ce qui concerne l'emploi de la pilocarpine.

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